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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,392	03/26/2004	Chang-Hun Lee	YOM-0297	7554
23413	7590*	07/07/2006	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			SCHECHTER, ANDREW M	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 07/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/809,392

Applicant(s)

LEE ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
4a) Of the above claim(s) 3 and 10 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1, 2 and 4-9 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 24 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Liquid crystal display having angled pixel and common electrode lines".

Response to Arguments

2. Applicant's arguments filed 24 April 2006 have been fully considered but they are not persuasive.

The applicant has amended independent claims 1 and 8 to recite the additional limitation "a source electrode", and argues that *Suzuki* does not disclose this limitation. This is not persuasive. From the viewpoint of the TFT, a source electrode is merely one of the electrodes which overlap the semiconductor layer; in *Suzuki*, the drain bus line [DL] itself overlaps the semiconductor layer, so the source electrode is merely a part of the drain bus line, and *Suzuki* already meets the amended limitation. Alternatively, since the claims do not recite a separate drain bus line (also called a data line or signal line), the entire drain bus line [DL] in *Suzuki* could be interpreted as the recited "source electrode", again meeting the amended limitation. In order to advance prosecution, the examiner will give a much narrower interpretation, assuming that by adding "a source electrode", the claims are meant to require that there is a substantially vertical drain bus

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line with a substantially horizontal projection which overlaps the semiconductor layer, and only such a projection from the drain bus line can be considered the source electrode. Then, *Suzuki* does not disclose such a horizontal projection (as argued by the applicant); however, such source electrodes are extremely well-known in the LCD art to use them, so the following rejections are appropriate.

Claim Objections

3. Claims 3 and 10 are objected to because of the following informalities: the claims refer to “the edges of the common electrode line and the pixel electrode line”, but there are two edges of each, and they are not parallel to each other (see claim 4, for instance). It is assumed by the examiner that these claims refer to the first edge. Appropriate correction is required.

4. Claims 3 and 10 are objected to because of the following informalities: “makes clockwise obtuse angles” in line 3 of each should be “makes counterclockwise obtuse angles”. Appropriate correction is requested. (The examiner is aware that claims 3 and 10 are withdrawn, but raises these issues now to expedite future proceedings; for instance, if a generic independent claim were allowed, these claims would be rejoined.)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 4, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Suzuki et al.*, U.S. Patent No. 5,905,556 in view of *Mori et al.*, U.S. Patent No. 5,367,179.

Suzuki discloses [see Figs. 20 and 21, for instance] a liquid crystal display comprising first and second substrates [1 and 5], a common electrode [CE] on the first substrate connected to a common electrode line [at top, say], making an obtuse angle; a pixel electrode [S] formed on the first substrate and alternately arranged with the common electrode, connected to a pixel electrode line [at top, say], making an obtuse angle; and a liquid crystal layer [M] interposed between the substrates, wherein a first edge of the common electrode line [the slanted portion] makes an obtuse angle relative to an initial molecular director [ϕ_{LC} , the direction of M, given as an angle from a vector going to the right horizontally] and a first edge of the pixel electrode line [the slanted portion] makes an obtuse angle relative to the initial molecular director [the slant of the electrodes is given by ϕ_A , and the condition that the angles are obtuse is mathematically equivalent to the condition $\phi_A < \phi_{LC} - 90^\circ$ given as equation (5) in col. 8; note that ϕ_A is a negative number when the slanted portions are oriented as in Figs. 20 and 21].

Suzuki does not disclose (at least as interpreted above) a source electrode. *Mori*

discloses [see Fig. 3, for instance] an analogous LCD where the data lines have source electrodes [17a] protruding from them to extend over the semiconductor layer [14]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have such source electrodes in the device of *Suzuki*, motivated by the desire to reduce the possibility of breaking the data lines as they go over each semiconductor element; with the source electrodes, a breakage at the semiconductor bump would only affect at most a single pixel (and possibly not even that), instead of an entire column of pixels. Claim 1 is therefore unpatentable.

There are alignment films [4, 6] which are rubbed [col. 6, lines 10ff.] giving the initial molecular director direction, so claim 8 is also unpatentable.

The initial molecular director makes a clockwise acute angle relative to the common electrode and the pixel electrode [see Fig. 20, equation (1)], and makes counterclockwise obtuse angles with the first edges of the common electrode line and the pixel electrode line [obtuse as discussed above, and the direction is clearly counterclockwise], so claims 2 and 9 are also unpatentable. A second edge [the top] of the common electrode line extends substantially perpendicular to the common electrode, and a second edge [the top] of the pixel electrode line extends substantially perpendicular to the pixel electrode, so claim 4 is also unpatentable.

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Suzuki et al.*, U.S. Patent No. 5,905,556 in view of *Mori et al.*, U.S. Patent No. 5,367,179 as applied above, and further in view of *Ono et al.*, U.S. Patent No. 6,774,956.

Suzuki does not disclose that the pixel electrode and common electrode are curved. *Ono* does disclose [see Fig. 1] an analogous device in which the pixel electrode and common electrode are curved. It would have been obvious to one of ordinary skill in the art at the time of the invention to use this shape for the electrodes in *Suzuki*, motivated by *Ono*'s teaching that electrodes in this shape produce a multi-domain-type device [col. 8, lines 31-32], which produces improved viewing angle properties. Claim 5 is therefore unpatentable.

The curved pixel and common electrodes of *Ono*, in the device of *Suzuki*, would be oblique to the second edges of the pixel and common electrode lines, so claim 6 is also unpatentable. The pitch of the curving of the electrodes is the vertical length of the pixel region; *Suzuki* discloses the pixel region as being 110 μm by 330 μm , so the pitch is larger than about 50 μm , and claim 7 is also unpatentable.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,877,827 to *Lee* discusses the problem of data bus line disconnections occurring when the data bus line passes over a step, and discloses a particular source electrode structure which alleviates this problem.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP


§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Nelms can be reached at (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
Primary Examiner
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28 June 2006